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ABSTRACT

The purposes of this study were to determine if differences in acquisition and retention existed between low IQ adults and normal twelve-year-olds, and to discover if differences in acquisition and retention of low IQ adults were affected by contrast conditions. Procedures established by Mahoney when he investigated visual short-term memory in retarded and normal children were used as a model. Nine low IQ adult functional illiterates enrolled in two adult basic education programs were given Mahoney's digit message test. Immediate recall was required after twelve of the messages and delayed recall with a rehearsal preventing 10-second interval was required after another twelve. Mean item recall scores for acquisition and retention of the adult subjects were compared to mean item scores of Mahoney's twelve-year-old normals. Analysis of the data indicated that a significant difference existed in acquisition between low IQ adults and normal twelve-year-olds. No significant difference was found in retention. Contrast conditions were not found to affect either acquisition or retention. (Author/WR)

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VISUAL SHORT-TERM MEMORY IN LOW IQ ADULT FUNCTIONAL ILLITERATES

A MASTER'S EQUIVALENCY

SUBMITTED TO THE FACULTY

OF THE GRADUATE SCHOOL OF EDUCATION

OF

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THE STATE UNIVERSITY OF NEW JERSEY

BY

JOAN FISCHER

IN PARTIAL FULFILLMENT OF THE

REQUIREMENTS FOR THE DEGREE

OF

DOCTOR OF EDUCATION

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TABLE OF CONTENTS

	Page
LIST OF TABLES	iii
LIST OF FIGURES	iv
Chapter	
I. STATEMENT OF THE PROBLEM	1
Definition of Terms	3
II. REVIEW OF THE LITERATURE	5
III. DESIGN, PROCEDURES, APPARATUS	12
Subjects	12
Procedures	12
Apparatus	15
Statistical Tests	16
IV. RESULTS	18
Hypothesis 1	18
Hypothesis 2	21
Hypothesis 3	23
Hypothesis 4	23
V. CONCLUSIONS	25
REFERENCES	29
APPENDIX	31

LIST OF TABLES

Table		Page
1.	Mean Item Scores for Low IQ Adults and Normal 12-Year-Olds	19
2.	Comparison of Low IQ Adults and Normal 12-Year-Olds on Acquisition and Retention	22
3.	Mean Item Acquisition and Retention Scores for Low IQ Adults Under Normal- and High-Contrast Conditions	24

LIST OF FIGURES

Figure		Page
1.	Mean Item Recall Scores for Low IQ Adults, Normal 12-Year-Olds, Retarded 12-Year-Olds, and Normal Mental Age Children	20

CHAPTER I

STATEMENT OF THE PROBLEM

During the last few years remedial elementary and secondary education for adults has received greater and greater emphasis. In the United States increasing funds have been channeled into adult basic education (ABE) and high school equivalency (HSE) through federal and state legislation. This thrust towards ABE and HSE was strengthened by Commissioner James Allen's speech in which he originated the phrase "right to read," and which eventually led to the national Right-to-Read program.

This program and other movements were reflective of the intensive interest in reading ability and a renewed effort for total national literacy. As a result, ever increasing involvement of adults in basic education and high school equivalency training programs has taken place over the last few years. The continued existence of a vast population reading below the eighth-grade level indicates that this involvement will continue. According to the most recent census figures, 14.4% of the population 25 years of age or older had less than an eighth-grade education (U.S. Bureau of Census, 1971, p. 161). This figure

does not reflect those persons who did complete a specific grade but were not functioning at that ability level. Nor did it reflect foreign-born or foreign-speaking adults whose literacy skills in English were nonexistent.

The national and state efforts to increase the reading ability of functionally illiterate adults were based on the assumption that those adults could learn if simply provided the opportunity. In accord with that assumption, basic education for adults became a mirror of elementary reading instruction. Adults were recycled through the same type of lessons, the same type of materials, and the same curriculum. Little effort was made to examine carefully the learning characteristics of functionally illiterate adults. Because of this lack of hard data, adult educators have made statements regarding their clients that were based on assumptions of what ought to be, on subjective perceptions of a few people, or on wishful thinking.

The purpose of this study was to initiate investigation of some of the learning characteristics of adult basic education students. Specifically, the study was limited to only one component--short-term memory (STM) of low IQ, functionally illiterate adults. These illiterate adults were compared to normal IQ 12-year-old students.

Definition of Terms

Adult Basic Education (ABE). Remedial education of adults functioning on a 0-8 grade reading equivalency level as measured by various standardized tests.

Adult. Any person 16 years and older who is no longer taking part in public school elementary or secondary education.

Functional illiterate. A person unable to read at or above the eighth-grade level.

Normals. Male elementary 12-year-olds whose IQ ranged between 90 and 119 and who evidenced no sensory impairment.

Low IQ adults. ABE students scoring from 58 to 76 on the Slosson Intelligence Test.

High School Equivalency (HSE). Training to pass the General Educational Development tests so as to receive an equivalency certificate.

Short-Term Memory (STM). The recall of digits immediately, or after a 10-second delay, that included interference. Specific aspects of STM used in this study are:

a. Immediate Memory (IMM). Recall of digital messages as soon as the stimulus was removed.

b. Delayed Recall (DR). Recall of digital messages after a 10-second filled interval.

Long-Term Memory (LTM). A memory store that is more permanent than STM.

Normal Contrast (NC). Black, 10-point type on a white field with no spacing between digits.

High Contrast (HC). Black, 36-point type on a yellow field and 1/4-inch spacing between digits.

Acquisition. Score received on the IMM items.

Retention. Score received on the DR items.

CHAPTER II

REVIEW OF THE LITERATURE

In order to determine the role of Short-Term Memory (STM) in information processing, several theoretical models of learning were reviewed. Careful perusal of these models confirmed that every theory included some common components. All agreed on the existence of a perceptual phase wherein the information was initially entered into the learning system and temporarily stored. All agreed on the separate existence of a memory process and storage system. Labels and specification of the various processes differed, as did speculations regarding the existence of one or more memory storages and the character of the relationships among the storage systems.

For the purposes of this paper, a brief review of the theories as they relate to STM has been included.

Norman specified that sensory input is stored in a sensory information store (Norman, 1970). This storage exists for the duration of the signal presentation while critical features of the sensory input are extracted and placed in an appropriate perceptual vector. The perceptual vectors are transformed into memory vectors by a

naming process which matches the distinctive features of the perceptual vectors with the sensory memory dictionary so as to identify the input. Information enters STM as a vector of attributes. Norman postulated that context, links, or associations rather than items are stored. No time duration was specified for STM, although Norman did state that STM and Long-Term Memory (LTM) differ primarily in permanence and completeness, and that information enters LTM only through STM. He also cited evidence that decay is due to time rather than the input of new items.

The multi-trace strength theory proposed by Wickelgren (1970) is unique in that it postulated four possible time traces rather than a sequential processing model. The four time traces were very short-term memory (VSTM), short-term memory, intermediate-term memory (ITM), and long-term memory (LTM). Traces in each of these memories may be characterized as visual, auditory, speech-motor, and abstract-verbal. STM, ITM, and LTM traces may independently pass through four phases--acquisition, consolidation, decay, and retrieval. VSTM was defined as memory for visual and auditory material that has not been attended to. This statement defined VSTM as a parallel function to the perceptual phase of other information processing models. STM was defined as lasting 1 to 20 seconds; ITM as lasting 20 seconds to minutes or hours, and LTM as lasting

hours, days, or longer. Wickelgren specified that all verbal learning tasks with rehearsal preventing retention intervals of minutes or hours was part of STM.

Bernbach's (1970) multi-copy model, on the other hand, postulated a single memory store wherein one or more replicas of an item were created and stored. He did not dwell on the perceptual phase, but did recognize its existence as a short-term sensory storage lasting less than one second. He also did not distinguish between STM and LTM as separate components or processes. Rather, he specified a short-term effect wherein not enough replicas exist for the item to appear learned. The total number of replicas that can be stored in memory was limited, thus each new replica caused one old one to be lost. When all replicas of an item have been lost, the item is said to be forgotten.

A computer-type information processing model was proposed by Reitman (1970). The system proposed consisted of a series of component processes and stores. Within this system Reitman included processes and stores that parallel the perceptual and memory phases of other models. The sensory register was the initial perceptual store that lasted for a fraction of a second. From this point an item was either lost or passed through the naming process into working memory, a store that parallels STM. Working

memory items were reorganized so as to derive the significant parts for more permanent storage in LTM. Reitman did not specify time definitions for each store.

A comprehensive theory of memory has been proposed by J. Mackworth (1971). This theory, as the others, included the components of perceptual store, called the iconic store, STM, and LTM. Mackworth's theory proposed that memory included visual, verbal, and auditory elements. Time elements were specified for the sensory visual trace (1/4 second) and for the iconic store (1-2 seconds).

Kumar (1971), in a thorough review of the literature, delved into the question of sensory register (SR), STM, and LTM as components of memory. His conclusions lent support to a model of memory characterized by a multiple storage system which includes these three stores. In defining the stores, Kumar stressed qualitative aspects of each trace rather than time limits. Although he notes that SR traces exist a very short time, he does not specify a definite range of seconds. The weight of the evidence he reviewed led him to conclude that information is processed from one store to the next. Forgetting or loss of trace may occur at any time. The pivotal function of STM is underscored as it is in this store that treatment of incoming information caused it to be either forgotten or transferred to LTM.

It appears from this brief review of learning theories that STM is a vital component of human learning. In all but Wickelgren's theory, entry into LTM is contingent upon acquisition and retention in STM.

In examining the research, one study in particular was reviewed as it served as the model for the present study. The purpose of Mahoney's (1972) study was to investigate the difference in acquisition and retention of normals and retardates, and the effect of contrast conditions on acquisition and retention. In his study, Mahoney used three groups of 15 male children each; two groups of normal subjects, one of retardates. The retardates were 12-year-olds having IQs between 50 and 75. One group of normals was matched with the retardates on mental age, the other was matched on chronological age. All exhibited IQs of 90 to 119. The tasks required consisted of digit messages presented visually and simultaneously. Each participant received a separate task depending upon his own visual span. Mahoney recorded an item score and a serial position score for each trial under each condition.

Each subject received 24 digit messages in all. Twelve were presented under normal contrast (NC) conditions and 12 under high contrast (HC). High contrast condition consisted of a yellow posterboard 5 x 7 card containing 36-point black boldface type. Within each contrast

group half of the trials required immediate recall (IMM). On the other half recall was required after a 10-second delay (DR) wherein the subject was asked to name colors. In considering the results of the item scoring analysis, Mahoney discovered that:

1. There is a significant difference in acquisition between retardates and normals matched on chronological age.

2. No significant difference in acquisition existed between retardates and normals matched on mental age.

3. No significant difference in acquisition of retardates was found between normal contrast and high contrast conditions.

4. Retardates scored significantly better in retention than did normals matched on CA, but not better than those matched on MA. Since this finding was unexpected, Mahoney utilized a ratio score (DR/IMM) to recompute retention scores. Thus analyzed, no difference in retention was discovered among the three groups.

5. Contrast did not affect retention.

The purpose of the present study was to investigate the potential learning ability of low IQ, functionally illiterate adult basic education students. To accomplish this, one component of the information processing

system was selected--STM. It must be noted that in relation to the theories postulated earlier in this section, the immediate recall tested by Mahoney may fall into the perceptual rather than the STM phase. The delayed recall, however, was a measure of STM according to any of the theories. Because it contained a readily available comparison group for the adult students, Mahoney's model was selected to ascertain if his findings were consistent across age groups.

Specifically, the hypotheses tested in this study were:

1. No acquisition differences exist between low IQ adults and normal 12-year-olds.

2. No differences exist in retention between low IQ adults and normal 12-year-olds.

3. No difference exists in acquisition of high contrast and normal contrast materials in low IQ adults.

4. No difference exists in retention of high contrast and normal contrast materials in low IQ adults.

CHAPTER III

DESIGN, PROCEDURES, APPARATUS

Since this study was essentially a replication and extension of Mahoney's study, the exact procedures and apparatus utilized in his study were used. However, some experimental subjects and statistical tests did differ.

Subjects

Subjects for this study were drawn from two New Jersey adult basic education programs. All nine were female adults ranging in age from 24 to 68, and in IQ from 58 to 76. As far as could be ascertained, none of the subjects had any sensory or emotional impairments that would interfer with the experimental task.

Procedures

As ABE programs in New Jersey do not administer IQ tests to their enrollees, each participant in this study was given the Slosson Intelligence Test (SIT) (Slosson, 1963) before receiving the digital test. Of three men and 11 women originally tested, the 11 women exhibited low IQ scores. All received the digit span test, but only nine were available for the digit message test.

In accord with the procedures followed by Mahoney, each subject was given a digit span test wherein he was asked to recall immediately digit messages varying in length from two to nine digits with an exposure rate of four seconds. The greatest number of correctly recalled items plus one constituted the digit span of each subject.

From his review of the literature, Mahoney concluded that to ascertain differences between normals and retardates it would be necessary to control the strength (number of digits) of acquisition so that the messages provided would be appropriate to each subject's capacity of acquisition. If the message was too difficult, the retention would be lowered because the material could not be acquired to begin with. If the message was too easy, the retention would be inflated because the subject would have time to rehearse the message. Since the intent of his study was to ascertain if retardates and normals differed in retention of information acquired, he sought to control the strength of acquisition through the use of a digit span test. An additional digit was added to the largest number of recalled items to allow for a practice effect.

To insure as accurate a replication of the tasks as possible, Mahoney's original messages were used in this study. As his order of presenting IMM and DR items was

determined by use of a table of random numbers, the same order was used when testing adult subjects. Each subject receiving a particular set of messages received those messages in the same order within a contrast condition. Determination of IMM and DR items was randomly determined by Mahoney, and this order was also retained in this study.

During the experimental session, each subject received 24 digit messages of a length corresponding to his digit span. Twelve of the messages were high contrast items; 12 were normal contrast. Within each digit span group it was randomly determined as to which contrast messages were given first to each particular subject. In half of the messages in each contrast condition immediate recall was requested; on the other half delayed recall was requested. Each of the delayed recall items was followed by a card containing several colored boxes. Subjects were asked to name the colors during the 10-second interval between message and recall.

In administering the digit messages, the best conditions possible were used. For each location in which testing was carried out, a subject was seated at a table underneath a fluorescent light. The digit messages were placed on the table between the experimenter and the subject, and were exposed at a rate of four seconds each. Subjects received instructions as to the correct

procedures, and received four practice trials to insure complete understanding.

For the purposes of this study, only item scores were utilized. Thus, the total number of correctly recalled digits, order disregarded, constituted the score for each message.

Apparatus

To determine IQs of ABE students, the Slosson Intelligence Test (SIT) was used (Slosson, 1963). This test is individually administered and requires no reading ability. In designating the use of the Slosson Intelligence Test, Mahoney reported that as it exhibited a high degree of correlation with widely used intelligence tests, it was considered sufficiently valid for use in his study (Mahoney, 1972, p. 65). A review of the comments regarding the SIT in Buros' Seventh Mental Measurements Yearbook (1972) reveals that several studies in addition to Slosson's have been completed exploring the reliability and validity of this instrument. Results of these studies vary widely although the author reports a reliability coefficient of .97 with standard deviations of 24.7 and 25.1 on the pre- and posttests, respectively. The author also reports correlations ranging from .90 to .98 with the Stanford Binet and other consistently high correlations with the Binet and the WISC. In spite of the criticisms

regarding the lack of adequate reliability and validity and the use of a ratio IQ score, the two reviewers conclude that the SIT is valuable as a screening device and that it can be a useful tool for selecting persons for more comprehensive study.

For the purposes of this study the use of the SIT was desirable as it was used in Mahoney's study and would thus provide a compatible IQ figure for the low IQ adults. In addition, it yielded a mental age (MA) figure which is useful in drawing implications from the results of the study and it is a relatively short test, thus proving less stressful for apprehensive adult subjects.

The digit messages were the same as those used by Mahoney. He reported that all were printed in Roman boldfaced style with pressure-type transfers manufactured by Instantype, Inc. (Mahoney, 1972, p. 66). A stopwatch was used to measure digit message exposure and delayed recall intervals.

Statistical Tests

Resulting data were analyzed by *t* tests of significance between means. Hypotheses 1 and 2 were analyzed by use of the *t* test for a difference between two independent means as data from two different groups consisting of different numbers of subjects were being used (Bruning & Kintz, 1968, p. 9). Hypotheses 3 and 4 were tested by

using a *t* test for related measures as data from only the adult group were being analyzed, and this consisted of less than 10 subjects (Bruning & Kintz, 1968, p. 12).

CHAPTER IV

RESULTS

The low IQ adults in this study exhibited an average IQ of 68.45 with a standard deviation of 6.20 as compared to Mahoney's normal 12-year-olds who exhibited an IQ of 103.87 with a standard deviation of 4.90. The adult group also exhibited a mean MA of 131.45 months with a standard deviation of 12.14. Mahoney did not report MA for his normal group, but by using the average CA of 12.2 and the average IQ of 103.87, an approximate MA of 12.8 can be determined. The MA for all adult subjects was calculated by using a CA of 16, as per the directions of the SIT. In actuality, the median age of the adult subjects was 32 with a range of 24 to 68. Reading ability of the adult group ranged from 0 to 6.9 with a median of 4.1.

Hypothesis 1

To test hypotheses 1 and 2, mean item score responses for IMM and DR were used. These mean item scores for IMM and DR consisted of a composite score for high contrast and normal contrast conditions, and are presented in Table 1. Figure 1 graphically illustrates

TABLE 1

MEAN ITEM SCORES FOR LOW IQ ADULTS
AND NORMAL 12-YEAR-OLDS

Group	N		Immediate recall			Delayed recall		
			NC	HC	Composite	NC	HC	Composite
Low IQ adults	9	Mean	5.81	5.56	5.69	3.72	3.70	3.71
		S.D.	.59	.65	.54	.91	.93	.72
Normal 12-year-olds	15	Mean	6.60	6.43	6.52	4.40	4.31	4.30
		S.D.	.89	.95	.93	1.10	1.13	.94

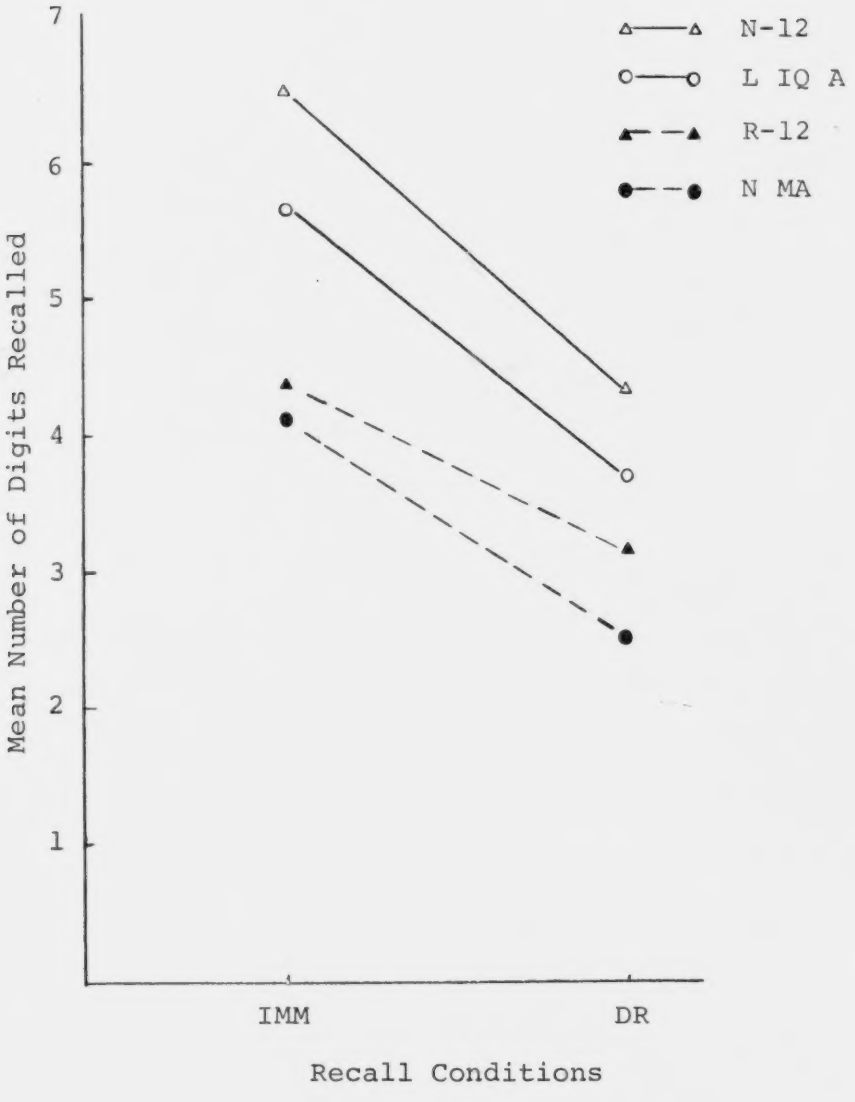

Fig. 1. Mean item recall scores for low IQ adults, normal 12-year-olds, retarded 12-year-olds, and normal mental age children.

the differences between the composite means of the two groups and the differences between the IMM and DR means. As contrasted to Mahoney's data wherein he noted that there were clear-cut, observable differences in the slopes of the retention curves (Mahoney, 1972, p. 69), only a slight difference can be noted between the adult group and the 12-year-olds.

To test hypotheses 1, composite item IMM scores for both groups were subjected to a t test for independent means. The results are summarized in Table 2. The significant t score indicates that acquisition of the normal 12-year-old group was significantly greater than that of low IQ adults. Thus, hypothesis 1 was rejected.

The significant finding in hypothesis 1 was in agreement with Mahoney's analysis of the data comparing the normal 12-year-olds and 12-year-old retardates, and tended to confirm the conclusion that adult retardates also exhibit a learning deficit. As the mean mental age (MA) of the adult low IQ group was 131.45 (or 10 years, 11 months), it was not possible to test for significance of differences between low IQ adults and a younger population matched on MA.

Hypothesis 2

Composite mean item DR scores were statistically compared by use of a t test for independent means to

TABLE 2

COMPARISON OF LOW IQ ADULTS AND NORMAL 12-YEAR-OLDS ON ACQUISITION AND RETENTION

Group	N		IMM	t	DR	t
Low IQ adults	9	Mean	5.69	3.21*	3.71	1.30
		S.D.	.54		.72	
Normal 12-year-olds	15	Mean	6.52		4.30	
		S.D.	.93		.94	

*$p < .01$.

determine if significant differences in retention existed between the adult and normal groups. The failure to reject hypothesis 2 because of a nonsignificant t score supported Mahoney's findings using adjusted ratio scores. This finding indicates that there is no retention difference between normal 12-year-olds and low IQ adults even though there is an acquisition difference, and supports Mahoney's contention that forgetting rates for normals and retardates are similar.

Hypothesis 3

Hypotheses 3 and 4 were tested by using the t test for correlated means which yielded the information contained in Table 3. The nonsignificant finding for differences in acquisition under normal and high contrast conditions resulted in a failure to reject hypothesis 3. This finding was in accord with Mahoney's.

Hypothesis 4

Statistical analysis of the means for DR item scores for normal contrast and high contrast conditions yielded a nonsignificant t score. As contrast conditions did not significantly affect retention in low IQ adults as well as in 12-year-old retardates, the study failed to reject hypothesis 4.

TABLE 3

MEAN ITEM ACQUISITION AND RETENTION SCORES FOR LOW IQ ADULTS UNDER NORMAL- AND HIGH-CONTRAST CONDITIONS

Score		NC	HC	t
IMM	Mean	5.81	5.56	1.238*
	S.D.	.59	.65	
DR	Mean	3.72	3.70	.056*
	S.D.	.71	.93	

*$p > .05$.

CHAPTER V

CONCLUSIONS

The purpose of this study was to explore the learning abilities of functionally illiterate adults. To accomplish this goal, the acquisition and retention abilities of low IQ functionally illiterate adults were compared to those of normal 12-year-olds. A model developed by Mahoney was utilized so as to provide a readily available comparison group and to compare results of this study with those of another using a similar but younger group. Statistical analysis of item scores to test the four hypotheses proposed in this study supported Mahoney's comparisons between normal 12-year-olds and retarded 12-year-olds.

The results of this study indicate that retardates do have an acquisition deficit that continues into adulthood. Though this deficit may decrease with age, it does not disappear. It is interesting to note that the slope of the retention curve of the low IQ adult group, when graphically superimposed onto Mahoney's graph containing the retention curves of normal 12-year-olds, retarded 12-year-olds, and a group of normals matched

with the retarded 12-year-olds on MA, falls neatly between the normal 12-year-olds and the retarded 12-year-olds. Since the low IQ adult group, with a mean MA of 12 years, 11 months, also falls between the two 12-year-old groups in MA, Mahoney's contention that groups matched on MA will exhibit no statistically significant differences in acquisition and retention may very well be correct even in terms of comparisons between adult and younger groups.

The fact that the acquisition task may be a function of perception is a point that must be considered. Using J. Mackworth's and Kumar's definitions of the perceptual phase, the acquisition task might be a test of perceptual memory. If their models are correct, the deficit of the low IQ adults may be a perceptual one and not one of STM. The result of this deficit is, however, the same: a limitation on the amount of material that enters the memory process.

To draw hard and fast conclusions from the results of this study would not be appropriate because of its limited nature. There are, however, several implications which can be stated and perhaps provide areas for further investigation. The finding that a significant difference exists in acquisition indicates that low IQ adult students cannot receive as much data as the normal 12-year-old child. A major implication for teachers of this finding

is that fewer items (of whatever type of unit) should be presented to such students during a learning session.

That no difference exists in retention implies that, although low IQ adults do have a deficit in acquisition, they do not have a deficit in retention of material they have acquired. This, in turn, implies that such adults may be slowed in their learning by acquisition limitations, but will retain a proportionate amount of that material as do normal children. This phenomenon will tend to result in a slow learning pace.

The process of testing STM acquisition and retention itself has important implications for operational programs. Knowledge of these scores could be used to make initial decisions regarding teaching procedures for incoming students. Such a test may reveal great potential in some illiterate adults and may prove to be of greater use than IQ tests which may suffer from cultural bias.

The implications this study has for overall learning of low IQ adults relates to the review of the models of learning. The postulation that the human learning system consists of at least three separate stores--SR, STM, and LTM--combined with the information that low IQ adults tend to have a deficit in acquisition which limits the amount of possible information they can retain, indicates that those adults are hampered in their overall learning

system. If initial acquisition is limited, the amount of information which can be retained is also limited. Since information can be lost through decay at several points in the process, the adult is less likely to process a given amount of information into LTM.

The findings that contrast conditions affected neither acquisition nor retention for retarded 12-year-olds or low IQ adults may indicate that use of large print and high contrast materials will not stimulate improved learning processes.

There are several areas which require further study to support the aforementioned implications:

1. The low IQ adult groups should be compared to two normal IQ adult groups; one which is functioning on an ABE reading level, the second functioning at a reading level commensurate with the average adult. These comparisons would produce data to ascertain if acquisition is related to reading achievement.

2. Similar studies should be completed utilizing meaningful material. This is particularly pertinent in relation to Kumar's point regarding the learner's control over acquisition and retention in STM.

3. Norms for acquisition and retention should be established and studies completed to discover if STM scores are valid for predicting future learning success.

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APPENDIX

Order of Presentation of Normal Contrast and High Contrast Digit Messages

Subject	Order
1	H-N
2	N-H
3	N-H
4	H-N
5	N-H
6	N-H
7	H-N
8	H-N
9	H-N

Sequence of Immediate Recall and Delayed Recall Messages Under Normal Contrast and High Contrast Conditions

Message number	Normal contrast	High contrast
1	DR	IMM
2	DR	DR
3	IMM	IMM
4	DR	IMM
5	IMM	DR
6	IMM	DR
7	DR	DR
8	IMM	IMM
9	DR	DR
10	DR	IMM
11	IMM	IMM
12	IMM	DR

Digit Space Test

62	975281364
493	85369714
5249	9173526
47528	346895
638241	13586
2519637	3762
12473958	725
739251684	19

Digit Message Tests

Two Digits

Practice

74
19
53
28

NC	HC
13	82
91	73
63	95
86	52
79	64
18	75
96	37
41	81
25	28
38	19
72	61
47	58

Three Digits

Practice

162
693
815
574

NC	HC
582	486
751	148
413	825
145	196
591	691
294	935
817	479
458	247
263	748
374	529
425	926
736	317

Four Digits

Practice

4251
6874
1475
3519

NC	HC
9614	1692
5169	4917
2713	7318
7526	1627
8516	8296
8431	9746
9384	2693
5283	5136
2574	7385
7581	8362
2751	9163
8162	4729

Five Digits

Practice

83627
16248
38274
71368

NC	HC
49685	53691
72485	93524
27315	75826
52847	38249
96251	91475
95274	51827
31427	69741
89316	61879
35197	16847
57231	86294
74251	41839
16274	42716

Six Digits

Practice

862791
731824
593718
374259

NC	HC
316248	574839
138274	963718
415297	637958
368157	749381
846931	285736
735146	538624
158937	471368
319485	268473
814953	574931
753964	917542
174356	483627
735248	691824

Seven Digits

Practice

8179246
9481362
2479358
4615729

NC	HC
9731824	8593674
2736148	3742591
8617495	2579183
9142536	6183952
4862791	1538426
5273691	6428571
4185362	3579148
2593718	8362791
4173682	3594178
9581726	3691485
5397261	4256371
3752946	3915826

Eight Digits

Practice

64281357
91468573
31657248
93157286

NC	HC
24971358	35719264
57261384	63194258
79413682	51638497
83975146	61428593
18246375	14835972
61359728	24186937
15749263	28631594
14697382	46157293
94813627	24793586
81427395	94752638
29641573	49372615
81792463	52497381

Nine Digits

Practice

617392485
915372648
258614739
249713586

NC	HC
642813579	941583726
946182753	592613847
316572489	274853196
493157286	619425738
291463758	372964581
394257816	264935718
753186294	159627483
736184925	289751364
149628735	938215647
361482759	465823197
572193846	186357249
613927485	697418352

VISUAL SHORT-TERM MEMORY IN LOW IQ ADULT FUNCTIONAL ILLITERATES

AN ABSTRACT OF A MASTER'S EQUIVALENCY

SUBMITTED TO THE FACULTY

OF THE GRADUATE SCHOOL OF EDUCATION

OF

RUTGERS UNIVERSITY

THE STATE UNIVERSITY OF NEW JERSEY

BY

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ABSTRACT

An investigation of short-term memory in low IQ adults was undertaken to initiate an understanding of learning characteristics of adult basic education students. This study sought to discover if differences in acquisition and retention existed between low IQ adults and normal 12-year-olds, and to discover if differences in acquisition and retention of low IQ adults were affected by contrast conditions. Models of learning theories and the role of short-term memory in those theories were reviewed. Procedures established by Mahoney when he investigated visual short-term memory in retarded and normal children were used as a model.

Nine low IQ adult functional illiterates enrolled in two New Jersey adult basic education programs were given Mahoney's digit message test, which consisted of 24 messages of normal- and high-contrast items. Immediate recall was required after 12 of the messages and delayed recall with a rehearsal preventing 10-second interval was required after the other 12. Mean item recall scores for acquisition and retention of the adult subjects were compared to mean item scores of Mahoney's 12-year-old normals.

Analysis of the data indicated that a significant

difference existed in acquisition between low IQ adults and normal 12-year-olds. No significant difference was found in retention. Contrast conditions were not found to affect either acquisition or retention. Implications drawn from these results stressed the probable slow pace of learning that will result from a deficit in acquisition, and the predictive possibilities of testing short-term memory in adult students. Suggestions for further research are included.